

Agent based autonomous Graphic Design Tool

“PICTURE IT”

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Abstract: In the current world all the activities are done by the use of communicating through very precise as well as an unambiguous Medias. That's why people try to convey their messages by displaying it using posters, brochures as well as by leaflets. To convey their message very precisely from such kind of Media, it should be properly design by people who has expertise knowledge about graphics as well as the design principals. So if a person who doesn't have such kind of expertise knowledge wants to design a poster, cover page of a book, he should hire that kind of expert. Sometimes it may be expensive for normal person to get his work to be done.

PICTURE IT is a designing tool that solves the problems arise in designing any paper work and maximizes the efficiency and preciseness in to a greater extend which anyone needed the most. This tool is implemented using multi agent technology which provides an intelligence that gives the designer a convenient and user friendly environment and builds the confidence as well. It is different from other applications that had been implemented for design purpose. That is it consists of some kind of autonomy that helps the user to design his or her imagination in to a successful media of convey the message.

This tool has the ability to self organize by itself which provides answers to the many questions in designing a poster, cover page, letter heads, brochure etc.

1. INTRODUCTION

The art of designing is not a simple thing. To design anything there should be the knowledge, experience as well as the creativity. Gaining those requirements is not an easy task. Everybody doesn't have such kind of expertise knowledge. It's true that most of the people got some kind of designing capability up to some extent. But those features are not enough to craft an excellent design unless he is an expert. Every architect in the world is a person who has an extraordinary knowledge on designing techniques as well as on design principals [6, 7].

Those techniques and design principals are not known by ordinary people. But sometimes those ordinary people also have to face an instant where he should design something.

People always get used to convey their messages to the world by a use of very attractive media. It might in

black and white, or through a poster, brochure or through a cover page of a book. People prefer to examine the message when it is on a very eye-catching form like posters, brochures rather than reading bunch of letters. To convey their message very precisely from such kind of Media, it should be properly design by people who has expertise knowledge about graphics as well as the design principals. Most of the time people design such kind of Medias without having proper design. Without having a proper design it doesn't convey the message to the people what they really want to be obtained. But to have such kind of good design they might have to hire an expert who is having such kind of knowledge. The cost for hire an expert may be unable to be afforded by them. Also to learn those master pieces of designing might take a long time. The problem is that people don't have that knowledge, but at that instant they want to design the media in an efficient as well as in a precise way [6, 7].

These days there are lots of graphic editing tools as well as graphic designing tools had been implemented in the world for the betterment of the graphic design. These tools can help to design enormous graphics or other gigantic designs which can attract people. They provide many features to handle with graphic designs on behalf of the design principals of graphic design. It's true that these tools provide many features, but it's useless if the user doesn't know to operate those features and how to apply those features in a graphic design to create it in a successful manner. These tools can only used by the people who have some kind of literacy of the graphic design principals.

1.1 Designing gap

Designing a poster, brochure or a cover page in a creative and convenient way is not an easy task. To do such thing there should be a knowledge base inside the person who is going to design the fact. Those people are called architects or experts in designing. Ordinary people can't design up to that standard. Because of that there is a gap between those two types of people [6]. As a result of that only the media designed by the experts are attracted by the public, not the media designed by the ordinary. The problem is ordinary people want to design their own media but don't have knowledge and resources for that.

1.2 What PICTURE IT does?

Earlier it mentioned that there is a gap between experts and ordinary people. It's true that the creativity is in ordinary people as well as experts. But the problem is that they don't have the idea of making that creativity in to a live media. The best answer for that is the PICTURE IT ultimate design engine. PICTURE IT is a computer base designing tool that provides a very user friendly as well as a convenient environment to the user. This tool has the skill to capture the users' ability of designing and automatically adapted to that by providing instructions to the user to drive him or her in the correct path.

It is not a must that the user should know every design techniques and the design principals. Only requirement is that he should have the ability to differentiate the categories of media. All the other instruction due to designs is provided by this tool to the user in an efficient way. Because of that this tool is called as an intelligent graphic designing tool. The most powerful technology in this tool is the agent technology [4].

When the user provide his inputs to the tool then the agents appear and communicate with each other and do the task at the correct time and in a correct way.

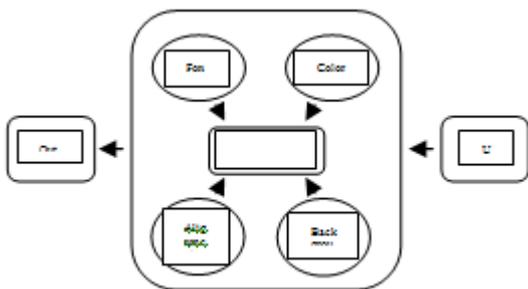


Fig1: agent diagram of PICTURE IT

2. OVERVIEW

People always get used to convey their messages to the world by a use of very attractive media. It might in black and white, or through a poster, brochure or through a cover page of a book. People prefer to examine the message when it is on a very eye-catching form like posters, brochures rather than reading bunch of letters. To convey their message very precisely from such kind of Media, it should be properly design by people who has expertise knowledge about graphics as well as the design principals. Most of the time people design such kind of Medias without having proper design. Without having a proper design it doesn't convey the message to the people what they really want to be obtained. But to have such kind of good design they might have to hire an expert who is having such kind of knowledge. The cost for hire an expert may be unable to be afforded by them. Also to learn those master pieces of designing might take a long time. The problem is that people don't have that knowledge, but

at that instant they want to design the media in an efficient as well as in a precise way.

When considering about the issues of graphic design we can identify two major issues [6, 7].

- The user doesn't have the knowledge of design principals. Because of that he can't come up with a better design.
- The user doesn't know how to operate the functionalities of the preferred design tool. As a result of that user might get frustrated.

These kind of major issues have become a very big barrier for the design criteria. Sometimes the user has the knowledge of the design principals. It means that he know how to design it. But he doesn't know how to operate the functionalities of the tool. In some case the user knows how to operate the option but doesn't know about the design principals. These kinds of issues block the ability of the particular user to design master pieces.

2.1 Design principals

The principles of design suggest effective and pleasing ways to arrange text and graphics on the page as well as the arrangement of individual elements within illustration, logos, and the overall graphic design of a document. Generally, all the principles of design apply to any piece you may create. How you apply those principles of design determines how effective your design is in conveying the desired message and how attractive it appears.

There is seldom only one correct way to apply each of these graphic design principles. Not all sources agree on which are the most important graphic design principles as follows [6, 7].

- Alignment
- Balance
- Consistency
- Contrast
- Proximity
- White space

These are the most widely recognized principles of design.

2.2 Alignment

Can you imagine how difficult it would be to find your car in a crowded parking lot if everyone ignored the parking lot stripes and parked in every which direction and angle? Imagine trying to get out of there! Alignment brings order to chaos, in a parking lot and on a piece of paper. How you align type and graphics on a page and in relation to each other can make your layout easier or more difficult to read, foster familiarity, or bring excitement to a stale design [6, 7]. Fig 2 shows how alignment works on a design.

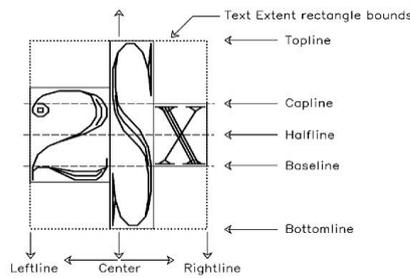


Fig 2: Graphic alignment

2.3 Balance

Try walking a long distance with a 2 pound bag of rocks in one hand and a 10 pound bag of marbles in the other. After awhile you'll want to shift your load around, putting a few marbles in the rock bag to balance your load, make it easier to walk. This is how balance works in design. Visual balance comes from arranging elements on the page so that no one section is heavier than the other, or a designer may intentionally throw elements out of balance to create tension or a certain mood [6, 7]. Fig 3 shows the balance of a design.

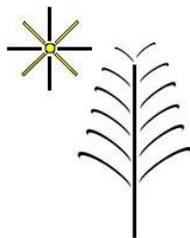


Fig 3: Visual Balancing

2.4 Consistency

What if Stop signs came in pink squares, yellow circles, or green triangles, depending on the changing whims of a town and a few of its residents? Imagine the ensuing traffic jams and accidents. Repeating design elements and consistent use of type and graphics styles within a document shows a reader where to go and helps them navigate your designs and layouts safely [6,7]. Fig 4 depicts the consistency of a design.



Fig 4: Graphic Consistency

2.5 Contrast

On the basketball court, one pro team looks much like another. But send a few of those players for a stroll down most any major city street and something

becomes apparent those players are much taller than your average guy on the street. That's contrast. In design, big and small elements, black and white text, squares and circles, can all create contrast in design [6, 7].

2.6 Proximity

Observe a group of people in a room. You can often learn a lot about who is listening intently to another person, which are strangers, or who is ignoring who by how close together they sit or stand. In design, proximity or closeness creates a bond between people and between elements on a page. How close together or far apart elements are placed suggests a relationship (or lack of) between otherwise disparate parts. Unity is also achieved by using a third element to connect distant parts [6, 7].

2.7 White Spacing

In page layout, illustration and sculpture, white space is often referred to as negative space. It is that portion of a page left unmarked: the space between graphics, margins, gutters, space between columns, space between lines of type or figures and objects drawn or depicted. The term arises from graphic design practice, where printing processes generally use white paper [6, 7].

White space should not be considered merely 'blank' space it is an important element of design which enables the objects in it to exist at all, the balance between positive (or non-white) and the use of negative spaces is key to aesthetic composition.

When space is at a premium, such as some types of magazine, newspaper, and yellow pages advertising, white space is limited in order to get as much vital information on to the page as possible. A page crammed full of text or graphics with very little white space runs the risk of appearing busy, cluttered, and is typically difficult to read. Some designs compensate for this problem through the careful use of leading and typeface.

Judicious use of white space can give a page a classic, elegant, or rich appearance. For example, upscale brands often use ad layouts with little text and a lot of white space. Inexpert use of white space can make a page appear incomplete.

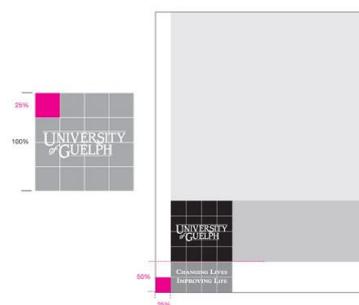


Fig 5: White spacing

3. SIMILAR APPROACHES

Designing has become a passion in the whole world. Convey a message through some kind of very attractive manner has become a very popular medium. To derive through this passion, lots of software development organizations have developed different applications to fulfill this requirement. Some of the popular applications are,

- Adobe Photo shop
- Adobe Illustrator
- Coral draw

4. HOW PICTURE IT WORKS?

PICTURE IT is kind of a tool that provides the capability of designing any design by any person. If the user has the knowledge of design principal or not can handle his or her design in a very successful manner. When we consider about the design it consists of different inputs and outputs. The main source of inputs is the user. First the user has to select the country according to the culture or the country that he is going to address through his master piece. The country agent handles all the color schemes related to it. Then all the other agents will activate when a necessity comes.

The main problem that has to be address is to identify the colors of the background and the foreground by the color agent. It is important to identify them because the images or the colors that we use to fill the spaces are changing every time. It is essential to identify a color identification methodology for it. PICTURE IT consists of several technologies. In implementing these technologies, we had to use several approaches or tools to address our requirements through those technologies. Therefore following are some of the specific tools and technologies which had been used to implement the system.[5]

Inter communication between agents is also a very important factor when designing these kind of intelligent tool. There should be a mechanism to do the intercommunication between agents. It means it should handle the messages pass through the message space. [4,8]

4.1 Design with agents

Now a days the world is consist of different objects and artifacts which is based on the great designs of great designers and architects. They are the people who have the ability to think of a design of a particular scenario according to the design principals. They have much knowledge about the designing techniques as well as the design principals which don't have by other ordinary people. They are the pioneers of the art. Lots of designs are emerged by a single stroke of his hand. The problem is that what if an ordinary user wants to design something using a design tool will face to a

problem. It's true that he or she can design it up to some extent, but it won't be a proper design.

PICTURE IT is a designing tool that solves all the problems arise in designing any paper work and maximizes the efficiency and preciseness in to a greater extend which anyone needed the most. This tool is a computer base designing tool which has an intelligence that gives the designer a convenient and user friendly environment and builds the confidence as well. It is different from other applications that had been implemented for design purpose. That is it consists of some kind of intelligence that helps the user to design his or her imagination in to a successful media of convey the message.

4.2 What is an Agent?

Agents are software or hardware entities that display a certain degree of autonomy. They are typically reactive and proactive and are able to communicate with other agents in order to jointly perform a certain task. PICTURE IT has several agents like font agent, color agent, background agent, alignment agent..etc. To present a marvelous design these agents should communicate each other and perform their tasks when it is necessary. [4, 8]

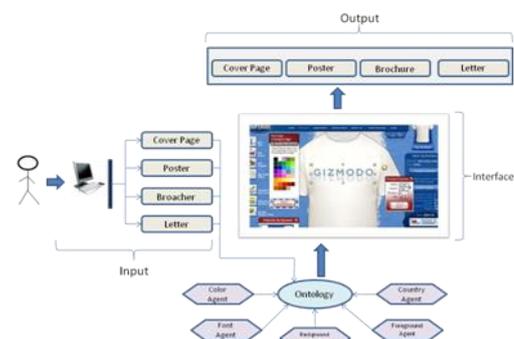


Fig 6: High level design diagram of PICTUREIT

4.3 Role of Multi Agent System in PICTURE IT

Agent-based systems technology has generated lots of excitement in recent years because of its promise as a new paradigm for conceptualizing, designing, and implementing software systems. This promise is particularly attractive for creating software that operates in environments that are distributed and open, such as the internet. Currently, the great majority of agent-based systems consist of a single agent. However, as the technology matures and addresses increasingly complex applications, the need for systems that consist of multiple agents that communicate in a peer-to-peer fashion is becoming apparent. [4, 8]

PICTURE IT is a multi agent system, because it consists of multiple agents.

- Color Agent
- Font Agent

- Background Agent
- Foreground Agent
- Country Agent

These unique agents are responsible in unique activities. They play their rolls according to the user request. To perform the correct activity they have to communicate each other. Inter communication between agents are very important in multi agent systems. Sometimes a single agent cannot perform towards the user request alone, since his ability is not enough to perform its' action. As a result of that he has to communicate with other agents and should get some help.

4.4 What is Ontology?

The word "ontology" seems to generate a lot of controversy in discussions about AI. It has a long history in philosophy, in which it refers to the subject of existence. It is also often confused with epistemology, which is about knowledge and knowing. Ontology is an explicit specification of a conceptualization. The term is borrowed from philosophy, where Ontology is a systematic account of Existence. For AI systems, what "exists" is that which can be represented. When the knowledge of a domain is represented in a declarative formalism, the set of objects that can be represented is called the universe of discourse. This set of objects, and the describable relationships among them, are reflected in the representational vocabulary with which a knowledge-based program represents knowledge. Thus, in the context of AI, we can describe the ontology of a program by defining a set of representational terms. In such ontology, definitions associate the names of entities in the universe of discourse (e.g., classes, relations, functions, or other objects) with human-readable text describing what the names mean, and formal axioms that constrain the interpretation and well-formed use of these terms. Formally, ontology is the statement of a logical theory. [4, 8]

Ontology can be any form of a knowledge base. It can be a simple XML file or else can be a normal data base. In PICTURE IT has a common ontology which has the knowledge of all the design principals as well as the design techniques. All the agents in this tool refer this common ontology as the knowledge base of it. Fig 7 shows how the common ontology works in an agent based application.

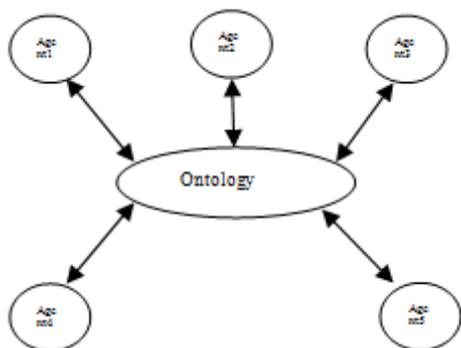


Fig 7 : Common Ontology

5. TEST STRATEGY

We have identified functional requirements and non functional requirement of this tool. To verify them that they do their appropriate task we should implement a test strategy. Since this tool is used by people, the main parameter that will take to test this is people. It means the users. They are the most capable fact in the test strategy.

We should let the people who know about the design principals and aware of design techniques to play around with this tool and must get their feedbacks about the advantages as well as the draw backs it has.

Also we give this tool to the ordinary people to work with and let them to do their corresponding design. Then get their feedbacks as well about advantages as well as the draw backs. By analyzing the results we can identify the improvements what should to develop as further work.

6. EVALUATION

Evaluation of the solution has been carefully planned and categorically assessed. All necessary activities were broken down and the primary decisions were taken place from the team in the project activities. At very first stage by submitting written project proposal, requirements feasibility and clearness of problem domain, appropriateness of technologies and adequate resources were identified.

Project was monitored on a regular basis during the course of the project life cycle, with the help of Gantt chart as well as meetings with supervisor. In the middle of the project life cycle period, using identified needs system was clearly defined as well as designed. Apart from details, by providing information on adapted technologies and its benefits, implementation details and database diagrams on interim report, evaluation was carried out to check whether project activities were in line, to achieve objectives.

Identified testing requirements were navigability (moving through the system with ease), codes efficient and robust (Error handling and Exception handling is completed or not), correct results from test cases according to plan and database connectivity correctness. After all developed Olympic Air-Pistol Shooting trainer system was tested using different strategies and test methods, results shown that the testing requirements were met as well

as ensured that the system is error free and have required quality. Below sections provide details of carried out different test approaches and results.

7. CONCLUSION

We know that the designing a poster, cover page or a Boucher is not an easy task when we go with the design principal. Conveying messages through this kind of very attractive media offer a meaning full message. It's true that most of the people like such kind of interactive media to observe than a plane text. To generate such kind of attractive and interactive media, only pioneers of the design filed are capable of doing that. Those are the people who know how to design and aware of the design principals. What if a person who doesn't have any knowledge of design principals and having very low design literacy wants to design a poster or other kind of related media?

It's true that they can handle it up to some extent but doesn't depict the exact message out of it. It's unfair that only pioneers got the opportunity do such king of task. The other ordinary people who has the hunger to design but don't have knowledge must come up with a proper solution. PICTURE IT is the designing tool that solves all the problems in designing by a hand of an ordinary user. PICTURE IT is a computer base designing tool that provides a very user friendly as well as a convenient environment to the user. This tool has the skill to capture the users' ability of designing and automatically adapted to that by providing instructions to the user to drive him or her in the correct path.

The most powerful technology in this tool is the agent technology. When the user provide his inputs to the tool then the agents appear and communicate with each other and do the task at the correct time and in a correct way.

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