INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

Crafts industry is largely dependent on skills of highly proficient employees. Art Craft and to some limited extent Design Traditions and practices are transferred from one generation to another by internship and are often confined to families or communities. Even though there has been modernization in the crafts industry the requirements and supply for highly skilled craftsmen has not kept pace with demand. Several instance of a line of crafts having died out because there being very few craftsmen willing to continue or train new interns which has come to light. Continuing the traditions is becoming difficult besides gaps in documentation. With decrease in artisan numbers and onslaught of mechanization & mass production crafts, accompanying skills and more important tacit knowledge surrounding them are likely to lose out.

The above scenario is leading to loss of 'Knowledge in crafts' that has been traditionally handed down through generations of crafts families. This thesis work posits that if there is a way to capture and preserve as well as transfer tacit knowledge of the craftsmen into some form of reusable digital documentation it is possible to replicate and preserve such knowledge and use it in the future especially so in the absences of expertise that resides in the human body mind and spirit when masters perishes. If 'Tacit knowledge' can be captured into digital form it is expected to remain safe for centuries, besides become a knowledge base for generations to come.

Such a tacit knowledge repository is expected to help in wide ranging knowledge engineering activities ranging from conservation to heritage mapping including anthropology as well as engineering and manufacture domains.

Two specific problems arose during this research.

- How to capture Tacit knowledge and
- How to transfer tacit knowledge from human knowledge domain to machine knowledge domain.

To answer the above several studies to observe craftsmen in the act of creation were documented using available mediums such as photography and videography. Interviews were conducted to understand and bring out thought process behind the tacit thinking of the craftsman. Another set of experiments have been attempted to capture, transfer and reproduce some aspects of tacit knowledge using digital tools.

This eventually led to a method for capturing, documenting and transferring ‘Tacit Knowledge’. The outcome is in the form of a fuzzy model, which binds the knowledge/skills of the craftsman embedded in his creation. The proposed fuzzy-based model accesses the craft products in terms of various design elements like color, shape, pattern, size and texture value. This fuzzy model developed is a step forward towards categorization of the craft product uniquely in terms of tacit knowledge of craftsman and craft product. Also an extension of the crafts knowledge was made using a transfer learning algorithm which is one of the advancement in Artificial Intelligence.

The experiments to prove certain assumptions and hypothesis that have been carried out in this work involved local craftsman working in the bamboo and craft and clay items making enterprises. Initial result indicates that to capture the many hues of tacit knowledge, an in-depth and cyclic study needs to be conducted in the form of dialogues and video documentation with the craftsperson while they are either practicing or are training other craftsperson. The mental maps of a craftsperson's thinking while practicing need to be developed. These mental maps will also act as conduits and sinks of the local culture and traditions where the crafts thrive.

It is possible to machine code tacit knowledge that goes into making, and deciding a product during its birth.