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Short Communication

Breaking Silos of Future Technological Developments in Field of Robotics

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Abstract. *The research focused to address growing complexity in technological domain of robotics. It provides a methodology to develop conceptual guidance frameworks based on Theory of Inventive Problem Solving (TRIZ) knowledge-base. The developed guidance framework will support thinking process of engineers at conceptual design stage of solution design. The innovative principles and most probable future directions provided by derived guidance framework will help engineers to seek breakthrough solutions more systematically. Such thinking support will result in better solutions and reduced complexity of solution hunting process.*

Keywords: conceptual guidance, thinking process, TRIZ, conceptual design, future directions.

In today's highly sophisticated technological developments, problem solvers and solution seekers got to struggle a lot for finding a viable competitive solution. For sophisticated technologies due to integration of multiple technologies in one system, expertise area is needed to be expansive for solution hunting teams. Hence, because of complexity and need of wide expertise, solution hunting process becomes costly and lengthy. In such situation, to reduce complexity and support engineers' solution hunting process, a systematic guidance based on innovative principles is a valuable asset[1].

Teams working with Field of robotics need a wide range of expertise like electronics, control engineering, design engineering, information technology, data handling and software etc. A sector specific guidance framework for domain of robotics, which can supplement to solution hunters' thinking process systematically with support from inventive principles, can reduce the complexity of solution hunting as well as time and costs. The guidance framework can be derived from patents' knowledge–base driven principles of Theory of Inventive Problem Solving (TRIZ), where TRIZ knowledge–base and innovation principles are derived from analysis of 200,000 patents[2]. TRIZ proposed the idea that all innovations and breakthrough solutions followed some certain principles. TRIZ researchers derived and interpreted those principles by analysis of patents, to achieve breakthrough solutions for future problems more systematically. This research developed a methodological technique derived from TRIZ researchers' works. The proposed methodology helps in deriving guidance frameworks for specific sector from TRIZ knowledge–base. This approach simplifies TRIZ usage for problem solvers working in specific sector and makes application of TRIZ principles more comprehensible for users with less TRIZ expertise[3].

In process of guidance development, Key Performance Indicators (KPIs) and major parameters involved in technological development of robotics domain may be sorted. By deep literature review of specific field, particular existing problems and technical contradictions can also be sorted in relation to parameters and KPIs. Further process of deriving the guidance follows the methodology described in Fig. 1, where stepwise derivation of principles and most probable solution directions can be achieved by using TRIZ tools and methods included in described methodology.

The results achieved from this derivation process can be compiled in form of a comprehensive guidance framework, which will provide most probable solution directions for existing problems in domain of robotics. The guidance framework will provide means to co-relate parameters of sought solution in robotics domain with innovative ideas providing guidelines of TRIZ knowledge–base. It will not only provide the contradiction resolving breakthrough ideas rather it will direct towards most

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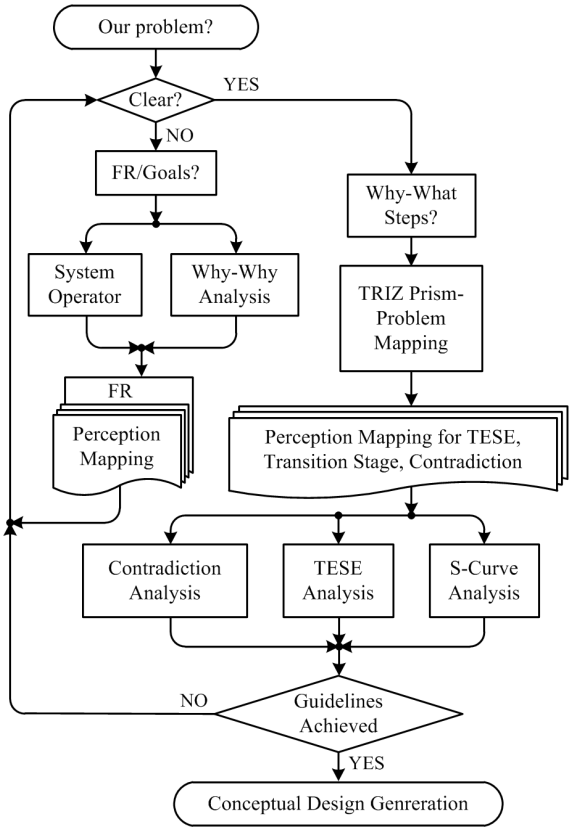

Fig. 1. Methodology flow chart for deriving TRIZ based guidance frameworks for specific sector

probable future transitions and potential gaps for competitive developments in future. It will provide conceptual guidance at early stage (conceptual design stage) of engineering design process to achieve a strong conceptual solution. This will reduce the complexity of solution design as well as iterations of design process[4]. This complexity reduction may result in reduced costs and less range of needed expertise to be involved in a solution team.

Conclusion

The arising complexity of technical systems because of diverse technologies being part of one system makes it difficult for solution seekers to address problems. A guidance framework based on innovative principles will add value to conceptual solution thinking process of solution seekers. Such guidance will make the process less complex and more cost effective because of reducing time and design iterations. Moreover, the guidance generated from TRIZ knowledge-base will also provide directions for potential gaps and future transitions of development for robotics domain, hence providing potential to have edge over competitors.

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