*International Journal on Emerging Technologies* **10**(1): 01-03(2019)

 **ISSN No. (Print) : 0975-8364**

 **ISSN No. (Online) : 2249-3255**

 **Comparative Study on Performance of Document Classification Using Supervised Machine Learning Algorithms: KNIME**

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**ABSTRACT: (Arial-Size 9- Bold) The manuscript should contain an abstract. The abstract should be self-contained and citation-free and should be between 150 and 250 words.**

### Keywords: Immediately after the abstract, provide 6-10 keywords in alphabetical order, avoiding general and plural terms and multiple concepts.

**Abbreviations:**GHGs, greenhouse gases;PCM, phase changing material; SC, solar chimney; GCHE, ground coupled heat exchanger; EAHE, earth air heat exchanger; GSHP, ground source heat pump; PV, photo voltaic; HVAC, heating ventilation and air conditioning; AC, air conditioner; PBP, payback period.

 **I. INTRODUCTION**

 This section should be succinct, with no subheadings.

**II.** **MATERIALS AND METHODS**

This part should contain sufficient detail so that all procedures can be repeated. It can be divided into subsections if several methods are described.

**III.** **RESULTS AND DISCUSSION**

This section may each be divided by subheadings or may further divided into next heads as shown below.

**Note:** Fig. Caption in figures will be in arial 9 font size. Tables will be in arial 8 font size.

*A. Passive systems*

Passive systems are based on renewable energy sources.

**PCMs.** PCM is gaining popularity for storing thermal energy. It has high energy storage density.

**Solar Chimney (SC).** It is old technology, work under principle of stack effect (temperature difference), as shown in Fig. 1. Key factor are solar radiation, air flow rates, solar absorbing plate, inclination angle and gap, cross sectional area of inlet and out let vent, which affect the ventilation rate [1].

In day time it absorbs solar energy but during night time requires heat storage mass i.e. PCMs. SC can be engaged in various applications i.e. ventilation, power generation, food drying [2,3 4].

**Wind Tower.** It is preferred for cooling purposes in windy areas, dry climate and absence of pollutants. Earlier it was known as wind catcher, installed at top of the building with the multiple directional openings to capture the more wind from all directions. It is able to work in both day and night for heating/cooling. During night hours cool air takes heat from warm walls then rise due to buoyancy effect [5].



**Fig. 1.** Solar chimney.

*B. Active systems*

Active systems consume fossil fuels (i.e. air heater, HVAC) or both i.e. renewable and fossil fuels like ground coupled heat exchanger (GCHE) systems. It is popular, energy efficient and environment friendly. GCHE systems can be classified as earth air heat exchanger (EAHE) system and ground source heat pump (GSHP) systems.

**EAHE System.**It consumes electricity to blow the air and use earth as heat sink for heating/cooling. EAHE system is also called as earth tubes, earth air pipe, air-to-soil heat exchanger, earth channels, earth canals, earth air tunnel systems, ground tube heat exchanger, subsoil heat exchangers, thermal labyrinths and underground air pipes. Earth temperature remains constant throughout the year to the annual average temperature approximately 5 meter deep. This constant temperature characteristic of earth is utilized for heating/cooling air that passes through buried pipe [6,7]. EAHE system is preferred to those areas where ground temperature fluctuates frequently and in high level. Key factors are air velocity, depth and length of buried pipes, thermal diffusivity of soil, etc.

**GSHP systems.** Concept of GSHP system was introduced in 1852 but got the viable recognition in 1960-70s. It follows the same principle as refrigerator. It takes electrical power to circulate the fluid through loop for utilizing constant earth’s temperature and exchanging heat. It is suitable for all seasons. It is popularly used in various applications in many developed countries i.e. United States, Canada, Switzerland, Sweden, Austria, Germany, etc. It can be further classified as regular and direct heat exchange geothermal system. Comparative study between passive and active systems is presented in Table 1.

**Table 1: Comparative study between passive and active systems.**

|  |  |  |
| --- | --- | --- |
| **Parameters** | **Passive systems** | **Active systems** |
| Cost | Low | High |
| Fuel | Renewable | Fossil or renewable and fossil both |
| Applicability | Restricted | in all climatic conditions, day and night both |
| Efficiency | Low | high |
| Life | High | moderate |
| Maintenance | Low | moderate |

It is concluded from Table 1 that alone passive or active systems are not appropriate and sustainable due to increasing energy demand trend in space heating/cooling. It forces us to adopt suitable hybrid systems according to tailor made situations.

**IV. CONCLUSION**

This should clearly explain the main conclusions of the work highlighting its importance and relevance.

**V. FUTURE SCOPE**

It is mandatory.

**ACKNOWLEDGEMENTS**

All acknowledgments (if any) should be included at the very end of the paper before the references and may include supporting grants, presentations, and so forth.

**Conflict of Interest:** Compulsory

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| **How to cite this article:** Soni, S.K., Bagyalakshmi, K., Vasu, D., Sharma, R. and Manikandan, R. (2019). Solar Energy development : Case study in Malaysia and Morocco. *International Journal of Emerging Technologies*, **10**(1): 01–03.  |