

Smart Villages: When Affordable Electronics Meets Internet for All

Abstract:

The role of Internet and Communication Technology (ICT) in bringing about a revolution in almost all aspects of human life needs no introduction. It is indeed a well-known fact that the transmission of information at a rapid pace has transformed all spheres of human life such as education, health, and economy to name a few. In addition, with the advent in Electronics and Photonics Technology (EPT), we have observed sustained growth and expansion in computation and display technology. From user demography perspective, urbanized population are the major beneficiary of such advances. Therefore, the benefits of ICT and EPT are yet to be experienced by almost 4 billion people in the world who are still “unconnected or under-connected” and suffer as such from the “digital divide,” a term coined in order to emphasize the lack of ICT infrastructure in many parts of the world.

Major challenges for widespread adoption of ICT and EPT in these areas are related to cost, lack of power supply, and complexities associated with learning and usage. However, if we can categorically overcome these challenges, then these technologies can be used for food, water, shelter, energy, environment, education, healthcare, and security. In addition, the wide-spread availability of these technologies, will lead to smart suburbs, smart towns, smart villages, etc., without the need to necessarily live in smart cities. This would reverse the trend and allow a more sustainable world with a more balanced distribution of the population density. In this context, this talk will present recently proposed solutions to provide high speed connectivity in rural areas along progress in affordable electronics to serve and contribute to the development of far-flung regions.

In particular, new solutions for both: (i) integrated satellite-airborne-ground networks providing global coverage and connectivity and (ii) terrestrial mesh/multi-hop directive networks connecting underserved areas will be discussed.