Abstract

Ghana like most developing countries has most of the toll booths across the country managed manually which more often than not is beset with many problems – the lack of transparency and accountability being main examples. Many at times personnel entrusted to run such systems mismanage the funds. In some cases, the daily sales are not properly accounted for and the infrastructure is not properly maintained. Considering various electronic tollbooths systems that have been deployed in many parts of the world and the innumerable advantages they bring to such countries; it is safe to say that this project will address the challenges faced in developing countries in relation to toll collection. This paper thus proposes the design of an electronic tollbooth collection and management system suitable for the local needs in developing countries particularly Ghana. The proposed system leverages the unique identification on Radio Frequency Identification (RFID) tags and uses it to identify a particular user’s account that has been registered with the system. This unique identity read by the RFID reader is relayed to the microcontroller unit responsible for processing the data and transmitting it wirelessly to an online server in charge of identifying the account the unique ID is associated with and
additionally handling the deductions from the specified user’s account. Feedback from this process is sent back to the microcontroller unit so the user receives a response about the status of the transaction. By this, accountability is achieved causing a domino effect of reduced traffic congestion, reduced fuel consumption, and carbon monoxide emissions and as well as the reduction in the travel time.

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Index Terms

Computer Science
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Keywords

Electronic Toll Collection (ETC), Toll Gate, Radio Frequency Identification (RFID), Drivers Vehicle and Licensing Authority (DVLA), Toll Credits, Global System for Mobile Communications (GSM).