Direct Integration of 3D Ultrasound Scans with Patient Educational Mobile Application

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Abstract : Advancements in Ultrasound Technology have enabled machines to capture 3D and 4D images with intricate features of the growing fetus. Sonographers can now capture clear 3D images and 4D videos of the fetus, especially of the face. Fetal faces are often seen on the ultrasound scan of the third trimester where anatomical features become more defined. Parents often want 3D/4D images and videos of their ultrasounds, and particularly image that capture the child's face. Sidra Medicine developed a patient education mobile app called 10 Moons to improve care and provide useful information during the length of their pregnancy. In addition to general information, we built the ability to send ultrasound images directly from the modality to the mobile application, allowing expectant mothers to easily store and share images of their baby. 10 Moons represent the length of the pregnancy on a lunar calendar, which has both cultural and religious significance in the Middle East. During the third trimester scan, sonographers can capture 3D pictures of the fetus. Ultrasound machines are connected with a local 10 Moons Server with a Digital Imaging and Communications in Medicine (DICOM) application running on it. Sonographers are able to send images directly to the DICOM server by a preprogrammed button on the ultrasound modality. Mothers can also request which pictures they would like to be available on the app. An internally built DICOM application receives the image and saves the patient information from DICOM header (for verification purpose). The application also anonymizes the image by removing all the DICOM header information and subsequently converts it into a lossless JPEG. Finally, and the application passes the image to the mobile application server. On the 10 Moons mobile app – patients enter their Medical Record Number (MRN) and Date of Birth (DOB) to receive a One Time Password (OTP) for security reasons to view the images. Patients can also share the images anonymized images with friends and family. Furthermore, patients can also request 3D printed mementos of their child through 10 Moons. 10 Moons is unique patient education and information application where expected mothers can also see 3D ultrasound images of their children. Sidra Medicine staff has the added benefit of a full content management administrative backend where updates to content can be made. The app is available on secure infrastructure with both local and public interfaces. The application is also available in both English and Arabic languages to facilitate most of the patients in the region. Innovation is at the heart of modern healthcare management. With Innovation being one of Sidra Medicine's core values, our 10 Moons application provides expectant mothers with unique educational content as well as the ability to store and share images of their child and purchase 3D printed mementos.
Keywords : patient educational mobile application, ultrasound images, digital imaging and communications in medicine (DICOM), imaging informatics
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