

 	<b>DESCRIPCIÓN BIBLIOGRÁFICA DEL TRABAJO FIN DE ESTUDIOS IKASKETEN AMAIERAKO LANARI BURUZKO BIBLIOGRAFIAREN DESKRIBAPENA</b>	PC 934 ANX1
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<b>Campos OBLIGATORIOS / NAHITAEZ bete beharreko eremuak</b>	
<b>AÑO / URTEA (20xx):</b> 2015	<b>Trabajo Fin de Grado (TFG) / Gradu Amaierako Lana (GAL)</b> <input type="checkbox"/> <b>Trabajo Fin de Máster (TFM) / Master Amaierako Lana (MAL)</b> <input checked="" type="checkbox"/>
<b>Título del TFG/TFM / GAL/MALaren izenburua:</b> Robust cto to us 3d-3d registration by using principal componente analysis and kalman filtering	
<b>Autor (Apellidos, Nombre) / Egilea (Deiturak, izena):</b> Echeverria Chasco, Rebeca	
<b>Director / Zuzendaria:</b> Cabeza Laguna, Rafael	<b>UPNA / NUP</b> <input checked="" type="checkbox"/> <b>Otro (Indicar) / Beste bat (Jarri)</b>
<b>Codirector, si existe / Zuzendarikidea, halakorik badago</b> 	<b>UPNA / NUP</b> <input type="checkbox"/> <b>Otro (Indicar) / Beste bat (Jarri)</b>

<b>Inglés Ingelesa</b>	<table border="1" style="width: 100%;"> <tr> <td style="background-color: #d3d3d3;"><b>Abstract (Resumen de 100-250 palabras) / Abstract (Laburpena 100-250 hitzetan)</b></td> </tr> <tr> <td> <p>Algorithms based on the Unscented Kalman Filter (UKF) have been proposed as an alternative for registration of point clouds obtained from vertebral ultrasound (US) and CT scans, effectively handling the US limited depth and low signal-to-noise ratio. Previously proposed methods are accurate, but their convergence rate is considerably reduced with initial misalignments of the datasets greater than 30 degrees or 30 mm. In this thesis, a novel method is proposed which increases robustness by adding a coarse alignment of the datasets' principal components and batch-based point inclusions for the UKF. Experiments with simulated scans with full coverage of a single vertebra show the method's capability and accuracy to correct misalignments as large as 180 degrees and 90 mm. Furthermore, the method registers datasets with varying degrees of missing data and datasets with outlier points coming from adjacent vertebrae. The method shows a mean Target Registration Error (mTRE) of 0.7646 mm, when a single vertebra is registered. Furthermore, the method registers datasets with varying degrees of missing data with a mean mTRE of 0.8094 mm and datasets with outlier points coming from adjacent vertebrae with a mean mTRE of 1.088 mm</p> </td> </tr> <tr> <td style="background-color: #d3d3d3;"><b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b></td> </tr> <tr> <td>           Ultrasound images, CT Images, Image Registration, UKF algorithm           </td> </tr> </table>	<b>Abstract (Resumen de 100-250 palabras) / Abstract (Laburpena 100-250 hitzetan)</b>	<p>Algorithms based on the Unscented Kalman Filter (UKF) have been proposed as an alternative for registration of point clouds obtained from vertebral ultrasound (US) and CT scans, effectively handling the US limited depth and low signal-to-noise ratio. Previously proposed methods are accurate, but their convergence rate is considerably reduced with initial misalignments of the datasets greater than 30 degrees or 30 mm. In this thesis, a novel method is proposed which increases robustness by adding a coarse alignment of the datasets' principal components and batch-based point inclusions for the UKF. Experiments with simulated scans with full coverage of a single vertebra show the method's capability and accuracy to correct misalignments as large as 180 degrees and 90 mm. Furthermore, the method registers datasets with varying degrees of missing data and datasets with outlier points coming from adjacent vertebrae. The method shows a mean Target Registration Error (mTRE) of 0.7646 mm, when a single vertebra is registered. Furthermore, the method registers datasets with varying degrees of missing data with a mean mTRE of 0.8094 mm and datasets with outlier points coming from adjacent vertebrae with a mean mTRE of 1.088 mm</p>	<b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b>	Ultrasound images, CT Images, Image Registration, UKF algorithm
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