

## *Kinfu – an open source implementation of Kinect Fusion + case study: implementing a 3D scanner with PCL*

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### Introduction

With this project, we aim to explore solutions for the reconstruction of real objects by analyzing the state-of-the-art algorithm Kinect Fusion that allows real-time reconstruction and rendering of a real world scene and one implementation of it. We use the point clouds obtained from Kinect Fusion and the PCL libraries to create a 3D scanner application and show the results of our work.

This document is divided in four parts:

- Part one introduces the Kinect Fusion algorithm with a detailed explanation of its inner workings.
- Part two introduces the Point Cloud Libraries (PCL) and KinFu, the implementation of the Kinect Fusion algorithm that is contained in PCL.
- In part three, the 3D scanner algorithm implemented using PCL is explained.
- In part four, example results obtained with the 3D scanner application are shown.

### Kinect Fusion

Kinect Fusion is an algorithm developed by Microsoft Research in 2011<sup>1,2</sup>. The algorithm allows a user to reconstruct a 3D scene in real-time and robustly by moving the Microsoft Kinect sensor<sup>3</sup> around the real scene. Where SLAM techniques provide efficient camera tracking but only rudimentary reconstructions, Kinect Fusion's results possess both a high degree of robustness and detail (see Figure 1 and Figure 2). A detailed explanation of Kinect Fusion's components and algorithm follows.

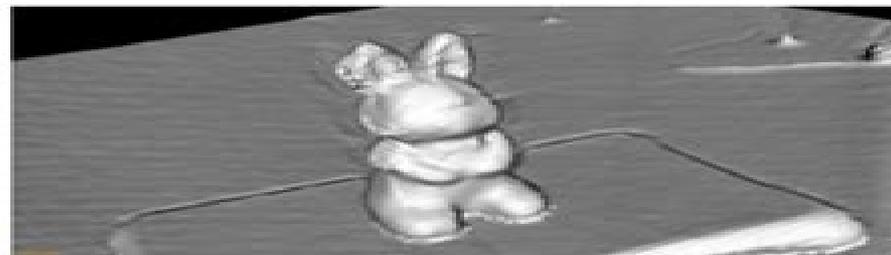


Figure 1 - A rabbit-like statue reconstructed with Kinect Fusion

<sup>1</sup> KinectFusion: Real-Time Dense Surface Mapping and Tracking

Richard A. Newcombe, Shih-Wei Lee, Otmar Hilliges, David Moyniaux, David Kim, Andrew J. Davison, Pushmeet Kohli, Jamie Shotton, Steve Hodges, and Andrew Fitzgibbon - October 2011 - IEEE ISMAR

<sup>2</sup> KinectFusion: Real-time 3D Reconstruction and Interaction Using a Moving Depth Camera

Shih-Wei Lee, David Kim, Otmar Hilliges, David Moyniaux, Richard Newcombe, Pushmeet Kohli, Jamie Shotton, Steve Hodges, Dustin Freeman, Andrew Davison, and Andrew Fitzgibbon - October 2011 - ACM Symposium on User Interface Software and Technology

<sup>3</sup> <http://en.wikipedia.org/wiki/Kinect>

# Kinfu An Open Source Implementation Of Kinect Fusion

**Robert R. Redfield**



## **Kinfu An Open Source Implementation Of Kinect Fusion:**

Kinfu An Open Source Implementation Of Kinect Fusion: Bestsellers in 2023 The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous captivating novels enthraling the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the captivating narratives that have enthralled audiences this year. Kinfu An Open Source Implementation Of Kinect Fusion : Colleen Hoover's "It Ends with Us" This touching tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover masterfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can prevail. Kinfu An Open Source Implementation Of Kinect Fusion : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids compelling storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Kinfu An Open Source Implementation Of Kinect Fusion : Delia Owens "Where the Crawdads Sing" This evocative coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of captivating stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a brilliant and gripping novel that will keep you guessing until the very end. The novel is a warning tale about the dangers of obsession and the power of evil.

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