

# Towards Automated Transcription of Label Text from Pinned Insect Collections

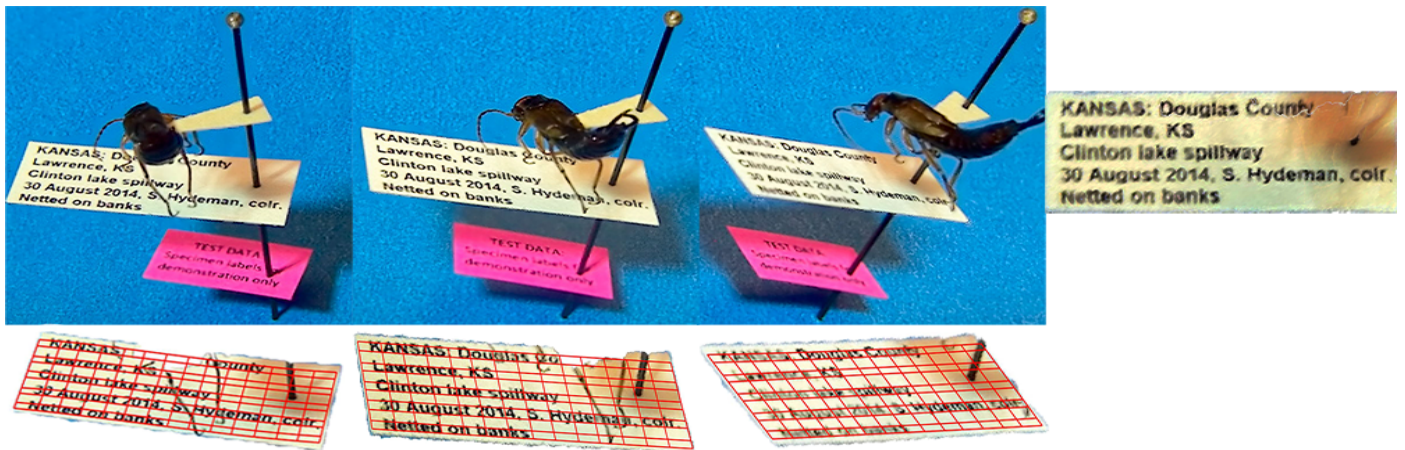


Images of drawers and trays containing actual pinned insect specimens from the Field Museum of Natural History. These images show the diversity in shape and size of the pinned insect and the labels which makes digitization of these insect collections challenging.

In this supplementary document we provide results of our algorithm on a sample of test and real labels (5 test labels and 17 real labels). We also provide qualitative analysis (as mentioned in the paper) on the composite images produced from the test labels before and after non-linear registration. The test labels were generated using text manually transcribed from labels found in our photographic survey of 21 drawers out of the collection. These enable us to compare automatic transcription results with scanned ground truth images. The real labels, including pinned insects, are specimens from the Field Museum of Natural History. For each label in both datasets we acquired 3 light field (LF) images from 3 different views using our camera-rig setup.

For each label dataset below, we show the 3 LF images of the label from the three different views (left-center-right camera location), 2D coordinate grid computed using our method on those labels and a final rectified-composited image (right) of the label. Note the robustness of our algorithm to occlusions (from the pin, label and the pinned insect), shadows of the pins, illumination changes, acute angles necessary to capture these labels due to different shapes and sizes of the pinned insect. During compositing we successfully recover pieces of text which were occluded from view in one of the cameras. Please zoom in to view all the images.

## Results on Real Labels





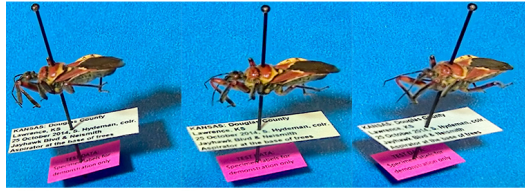
ECUADOR Napo Prov.  
Estación Científica Yasuni  
0°40.47' S 78° 25.83' W,  
216m, 5-10.X. 1999  
primary forest, UV light,  
E.G. Riley, TAMU 980  
FIELD MUS. NAT. HIST.



KANSAS: Douglas County  
Lawrence, KS  
25 October 2014, S. Hydeman, colr.  
Jayhawk Blvd & Neismith  
Aspirator at the base of trees



ECUADOR Napo Prov.  
Estación Científica Yasuni  
0°40.47' S 78° 25.83' W,  
216m, 5-10.X. 1999  
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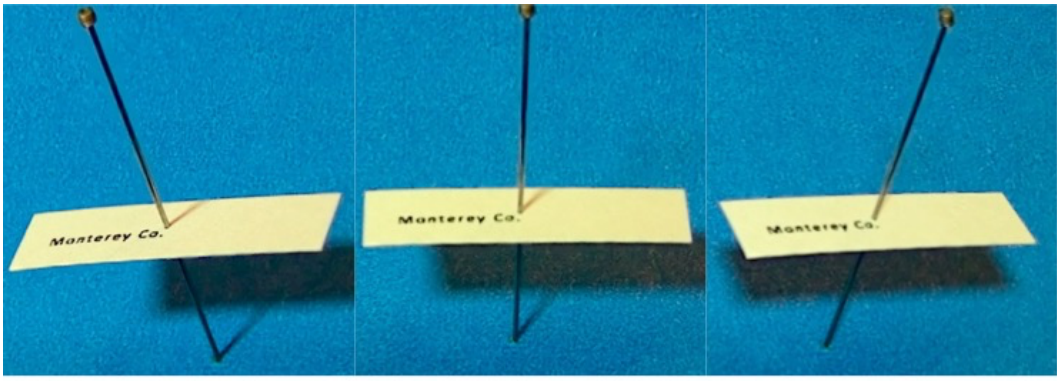


KANSAS: Douglas County  
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25 October 2014, S. Hydeman, colr.  
Jayhawk Blvd & Neismith  
Aspirator at the base of trees

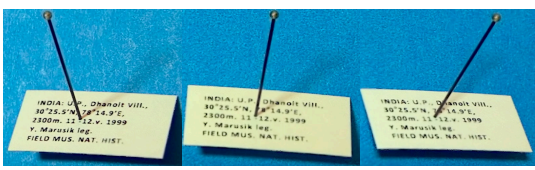
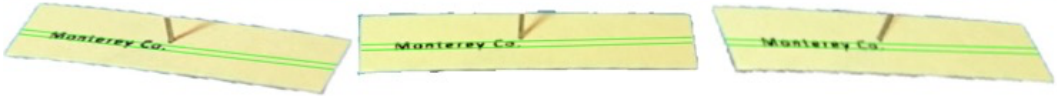


### Results on Test Labels with Qualitative Analysis

Below are the results from the test labels along with their qualitative analysis. To perform qualitative analysis, three different individuals visually inspected the composites produced from the test label dataset before and after non-linear registration. Each individual was asked to rate whether the composite was readable (Y), partially readable (M) or not readable (N). If the individual was unsure, they could rate the composite with two ratings. Consensus was drawn from the three individuals by taking their lowest rating for each composite. This is written below the composite for each label dataset. These final consensus rating were also used in Figure 12 and Figure 13 of the paper. (Note, although the text on some composites might be same, those labels were captured from different camera positions and angles making them a different dataset.)



affine - Y  
nonlinear - Y



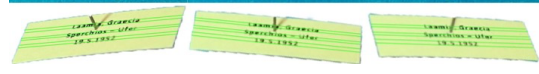
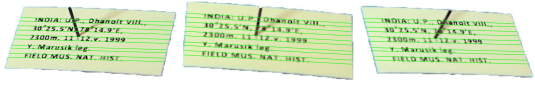
INDIA U.P. Dhanot VII.  
30°25.5'N, 78°14.9'E,  
2300m, 11-12.v. 1999  
Y. Marusik leg.  
FIELD MUS. NAT. HIST.

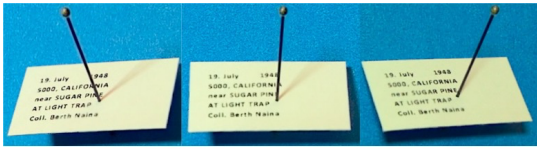
affine - N  
nonlinear - Y



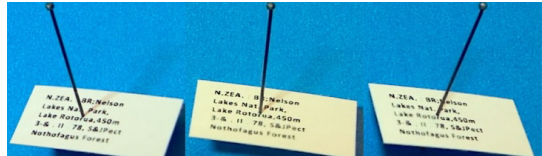
Laami, Graecia  
Sperchios - Ufer  
19.5.1952

affine - Y  
nonlinear - Y





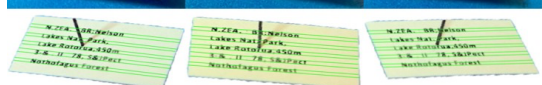
19 July 1948  
5000 CALIFORNIA  
near SUGAR PINE  
AT LIGHT TRAP  
Coll. Berth Naina



N.ZEA, BR-Nelson  
Lakes Nat. Park,  
Lake Rotofua, 450m  
8-8 II 7B, 5&1Pect  
Nothofagus Forest



affine - N  
nonlinear - Y



affine - M  
nonlinear - Y



Mt. Rainier,  
Washington



Trachypellius  
novilla Collins  
Det. SA Marshall '88

affine - Y  
nonlinear - Y

affine - M  
nonlinear - Y



ORE: Grant Co., 5000'  
E of Prairie City  
Dixie Pass Blue  
1. vi. 1957, Is Dybas  
Ber. garbage & forest  
subletter



N. GUINEA Highlands  
Dist. Goroka, El. 5200'  
1V51971

affine - Y  
nonlinear - Y

affine - Y  
nonlinear - Y



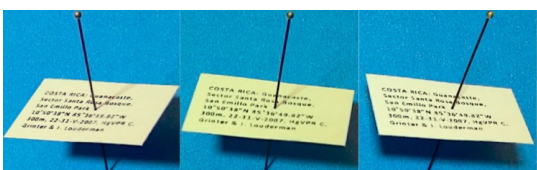
F. Peus leg.



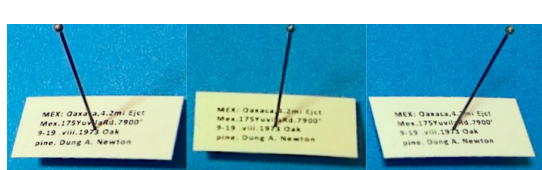
Laphria  
nitidula  
FABRICIUS, 1794

affine - Y  
nonlinear - Y

affine - M  
nonlinear - Y



COSTA RICA, Guanacaste,  
Sector Santa Rosa, 800m,  
22.11.1957, Heppner C.  
Stricker & J. Loebnerman



MEX: Oaxaca, 4.2mi Ejct  
Mex. 175Yujia Rd, 7900'  
9-19 viii. 1975 Oak  
pine, Dung A. Newton

affine - N  
nonlinear - Y

affine - N  
nonlinear - Y



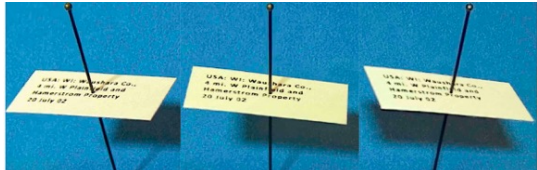
Laphria  
nitidula  
FABRICIUS, 1794



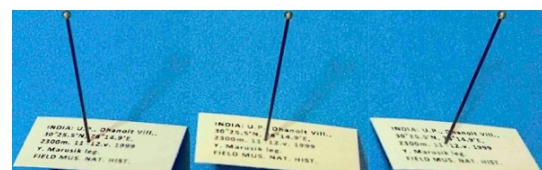
USA, WISCONSIN, Jackson Co.,  
Black R. 50, Poplar,  
Leg. J. Bengtson, 10.13.1974,  
874-39 8100

affine - Y  
nonlinear - Y

affine - M  
nonlinear - Y



USA, WI, Walworth Co.,  
4 mi. W Pilsbald and  
Hamersmith Property,  
20 July 52



INDIA, U.P., Dhanraj VII,  
2000m, 12.12.1989,  
X. Mearns, Field Mus. Nat. Hist.

affine - N  
nonlinear - M

affine - N  
nonlinear - N