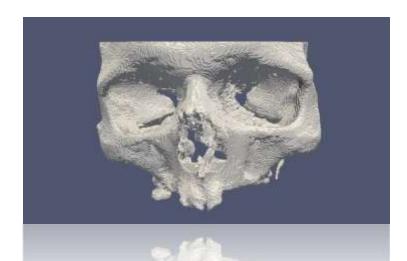
Présentation stage

Modélisation géométrique tridimensionnelle des parois osseuses des sinus aériens chez l'Homme à partir d'images scanner X



David ABEZA

Gérard SUBSOL

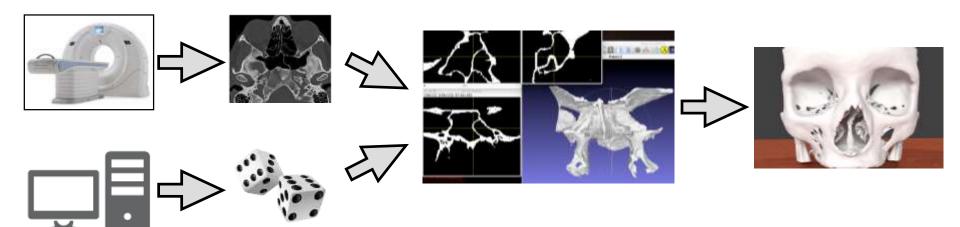
26/08/2019

Valentin FAVIER



CONTEXTE Médical

Création de modèle



Planification préopératoire

Entraînement / simulation

Finalité
Cours
anatomique

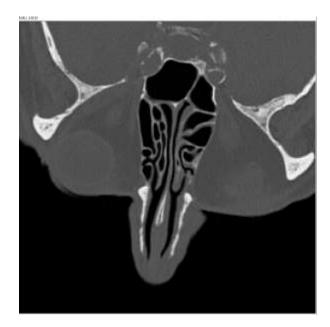
Test dispositifs

Test techniques

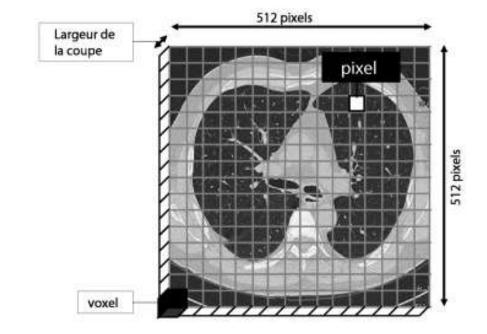
CONTEXTE Définitions

Image 3D d'un scanner X

• Matrice 3D • Voxel



• Image d'absorption RX • Hounsfield (UH)



SEGMENTATION

Problèmes

SEGMENTATION

Objectifs de la segmentation

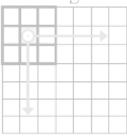
• Algorithme générique

• Limiter les paramètres d'entrées

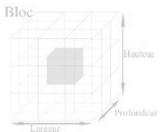
Accessible



Amélioration de l'algorithme segmentation précédent



Valeurs



Seuil local

Post-traitements



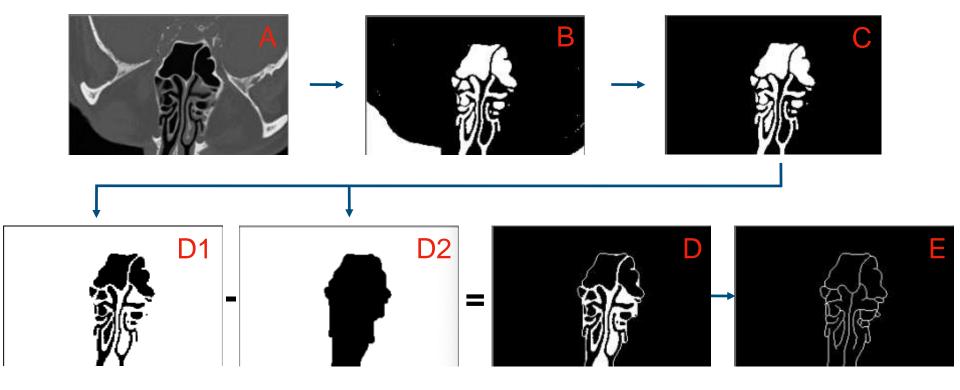
Développement d'un nouvel algorithme pour sortir le squelette





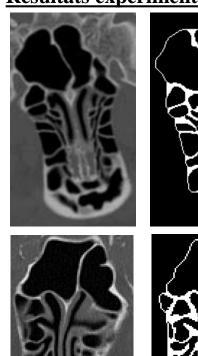
SEGMENTATION Squelette 3D

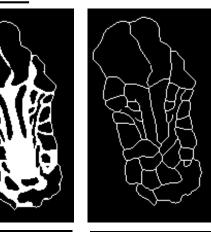
Principe de fonctionnement

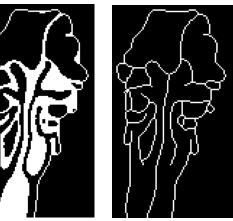


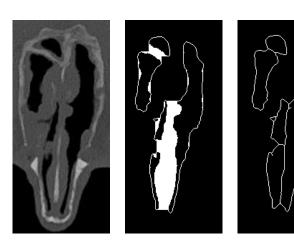
SEGMENTATION Squelette 3D

Résultats expérimentaux









Géométrie fidèle

Limiter par la quantité de muqueuse

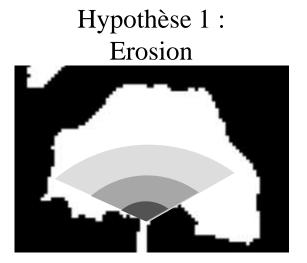
Combinaisons possibles avec seuil local

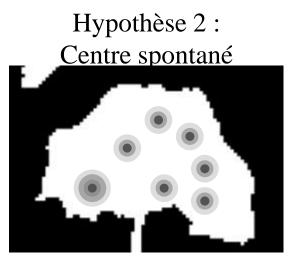
GENERATION

Definition

GENERATION PROCEDURALE

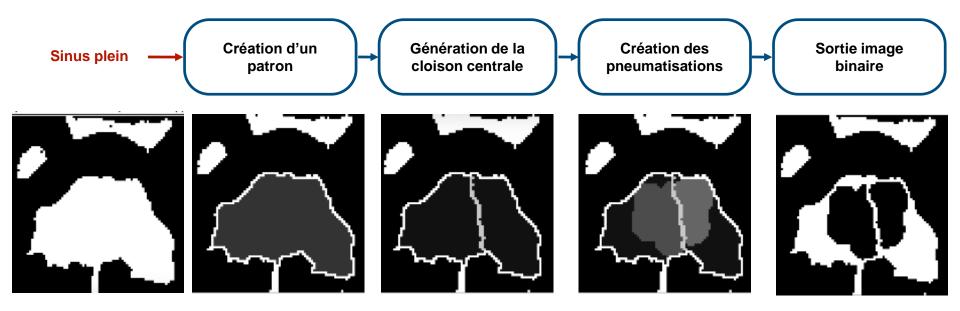
Génération de la pneumatisation :



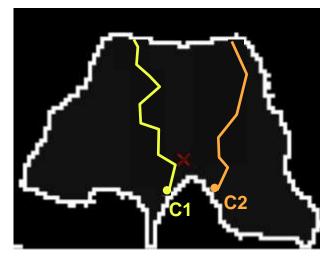


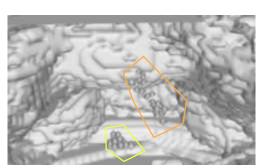
A l'heure actuelle, le processus de pneumatisation du sphénoïde est inconnue!

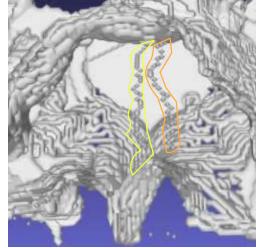
Principe de fonctionnement

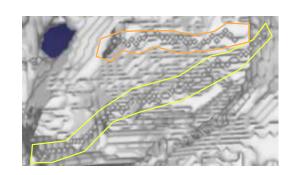


Principe de fonctionnement : Création du chemin

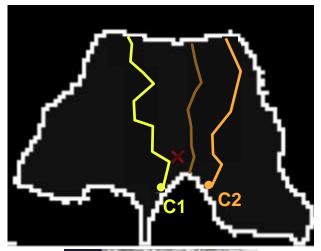


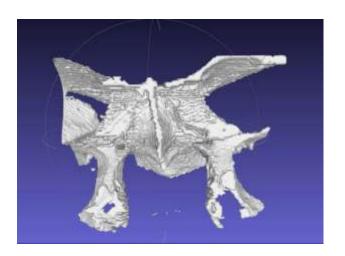


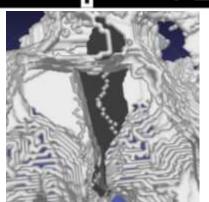


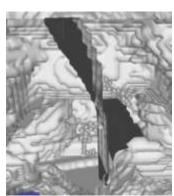


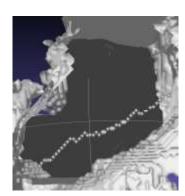
Principe de fonctionnement : Création de la paroi





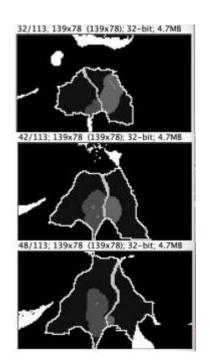


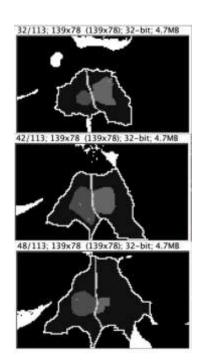


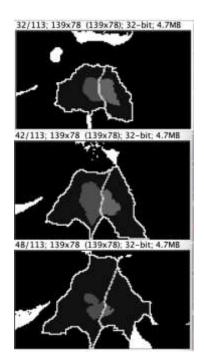


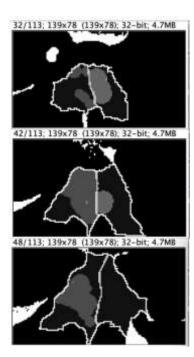
Principe de fonctionnement : Gestion de la pneumatisation

4 implémentations faites









Objectifs: Tester des pistes de recherches

Amélioration seuil local

Paroi centrale jugée réaliste par un expert

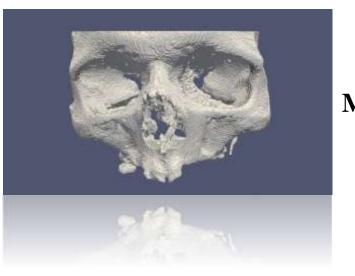
Squelettisation est interessante

Pneumatisations à améliorer

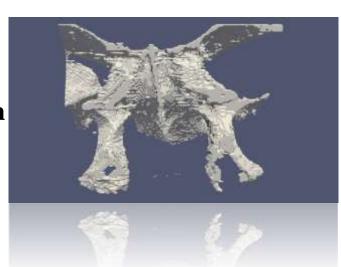
Muqueuse toujours problématique

Travail sur la structure externe

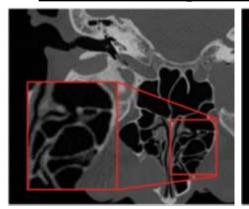
Possibilité de fusion des algorithmes

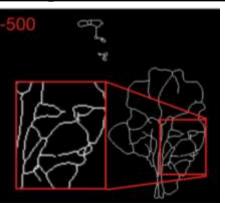


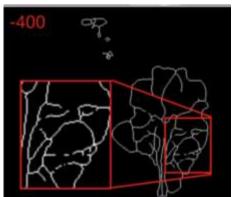
Merci de votre attention

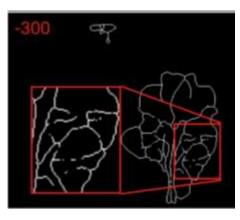


Evaluation du squelette : Importance du seuil d'air

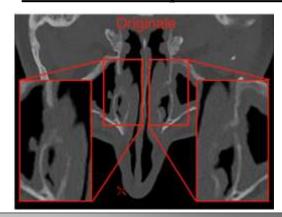


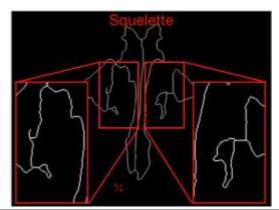


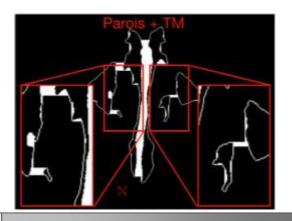




Evaluation du squelette : Problèmes de la muqueuse

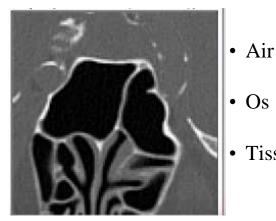






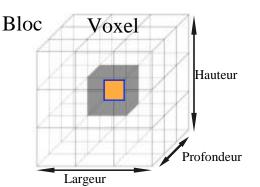
David ABEZA

Modélisation géométrique tridimensionnelle des sinus aériens

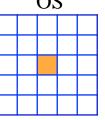


• Os

Tissus Mous



OS



* Valeurs fortes

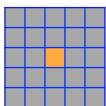
Ecart type moyen/fort **AIR**



Valeurs faibles

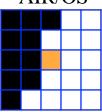
* Ecart type moyen/fort

TM



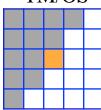
- Valeurs médianes
- * Ecart type faible/moyen

AIR/OS



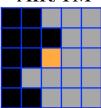
- * Valeurs fortes et faibles
- * Détection efficace

TM/OS



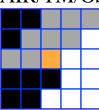
* Détection moyenne (Faux Négatifs importants)

AIR/TM



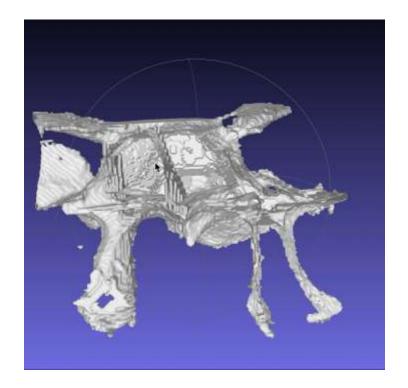
* Détection sensible (Faux Positifs importants)

AIR/TM/OS



* Zone difficile

Carte distance, % constant



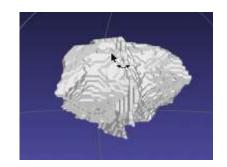
Carte chemin 1

1	1	1
1	1	1
1	1	1

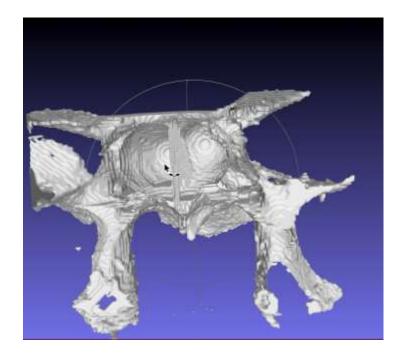
Carte chemin 2

1	1	1
1	1	1
1	1	1





Sphères centrées



Carte chemin 1

1	1	1
1	1	1
1	1	1

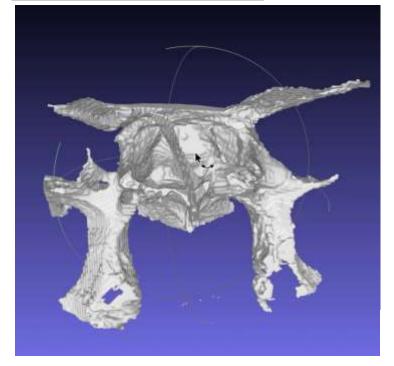
Carte chemin 2

1	1	1
1	1	1
1	1	1





Carte distance, % variable



Carte chemin 1

1	1	1
1	1	1
1	1	1

Carte chemin 2

1	1	1
1	1	1
1	1	1



